

HP® LASERJET ENTERPRISE 500 COLOR M551 TONER CARTRIDGE REMANUFACTURING INSTRUCTIONS



HP CE400X TONER CARTRIDGE

REMANUFACTURING THE HP LASERJET ENTERPRISE 500 COLOR M551 BLACK & COLOR TONER CARTRIDGES

By Mike Josiah and the Technical Staff at UniNet



First released in August 2011, the M551 series of color laser printers are based on a 33 ppm, black and color, 1200 x 1200 DPI engine (3600 DPI with RET). The M551 cartridges are an all-in-one type cartridge that consists of the toner supply, drum, and waste chamber. New machines ship with full “A” style low yield cartridges, not starters. Note also that the drum faces up, not down, when placed in the printer. Because of this machine layout, we will take a moment and run through the printer theory before getting started. These cartridges are basically rectangular shaped that come with a toner seal and a snap-on drum cover across the bottom to protect the drum.

These printers also have a separate waste bottle to collect the waste toner from the ITB (image transfer belt).

These cartridges also use chips that need to be replaced each cycle.

PRINTERS BASED ON THE CPM551 ENGINE

HP LaserJet Enterprise 500 M551n

HP LaserJet Enterprise 500 M551dn

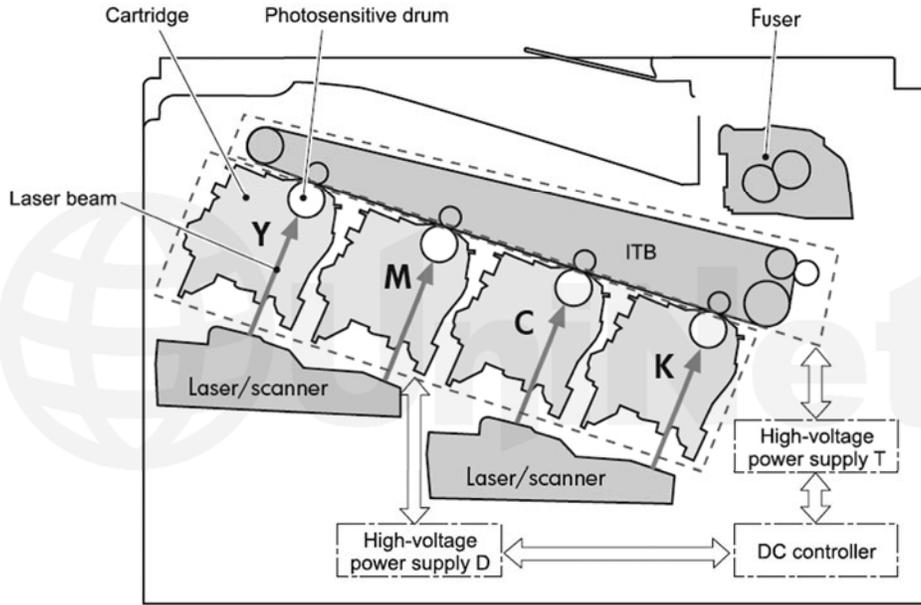
HP LaserJet Enterprise 500 M551xh

CARTRIDGES USED IN THESE MACHINES

CE400A (Black)	5,500 pages	\$147.00 List*
CE400X (Black high yield)	11,000 pages	\$197.00 List*
CE401A (Cyan)	6,000 pages	\$219.99 List*
CE403A (Magenta)	6,000 pages	\$219.99 List*
CE402A (Yellow)	6,000 pages	\$219.99 List*
CE254A (Toner collection unit)		\$12.99 List*

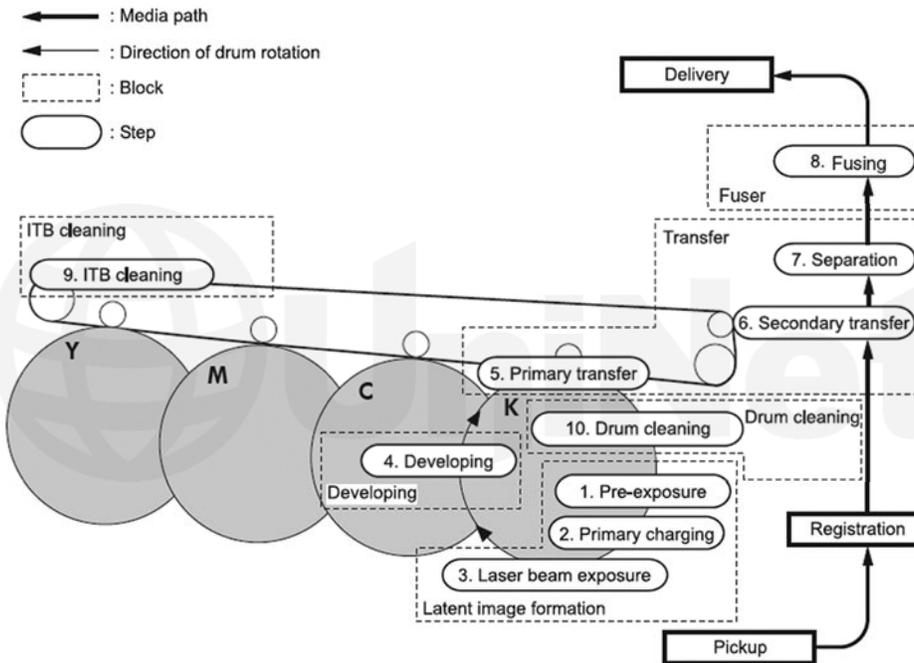
*Pricing (in US American Dollars) current as of December 2011.

These are also known as the 507 Series. The colors and low yield black are the 507A, and the high yield black is the 507X. So if your customer calls looking for a 507A cartridge, you're going to need more info from them.

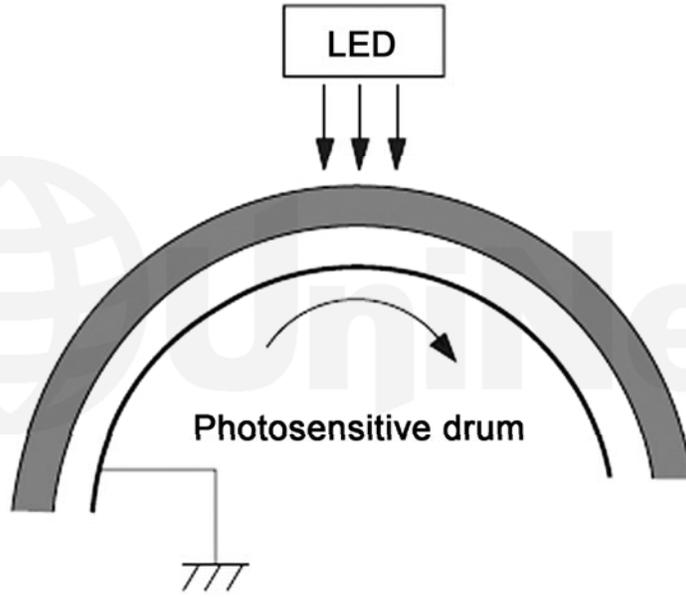


HP LASERJET ENTERPRISE M551 COLOR PRINTING THEORY

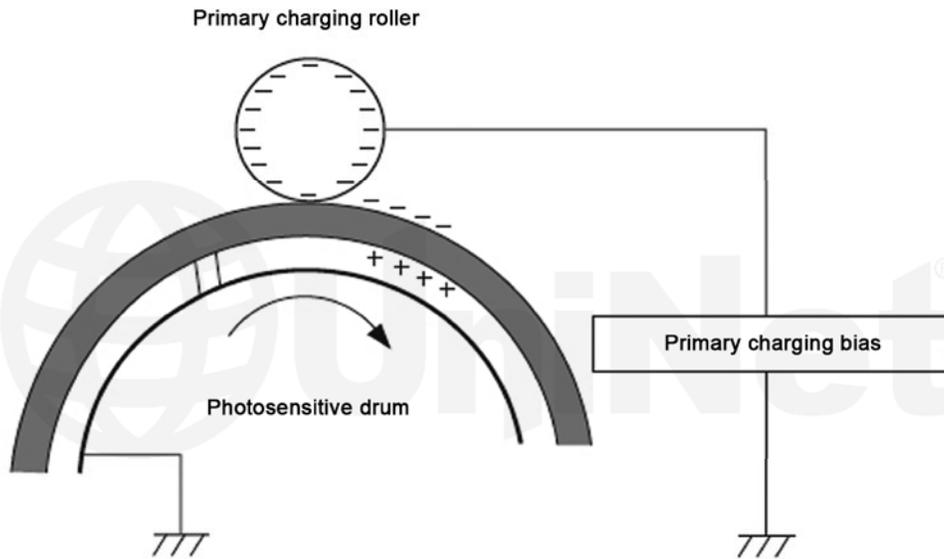
The color toner cartridge printing process happens in a series of stages or steps. For the purpose of this article, we will call them stages. Shown is the basic layout of the cartridges and how they relate to one-another and the printer. Note that while this is still a single-pass system, the layout is completely different from any previous Canon/HP machines. The laser units are on the bottom, the cartridges are at an angle, and the ITB is on top.



Shown is the complete image formation process.

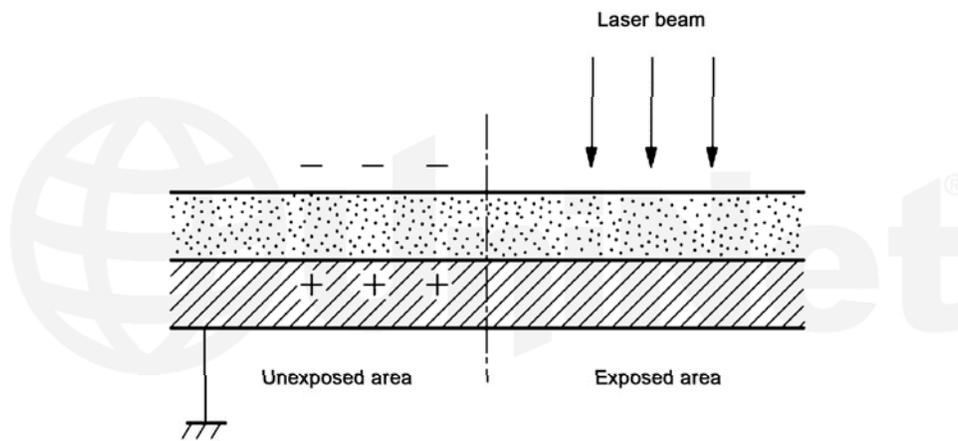
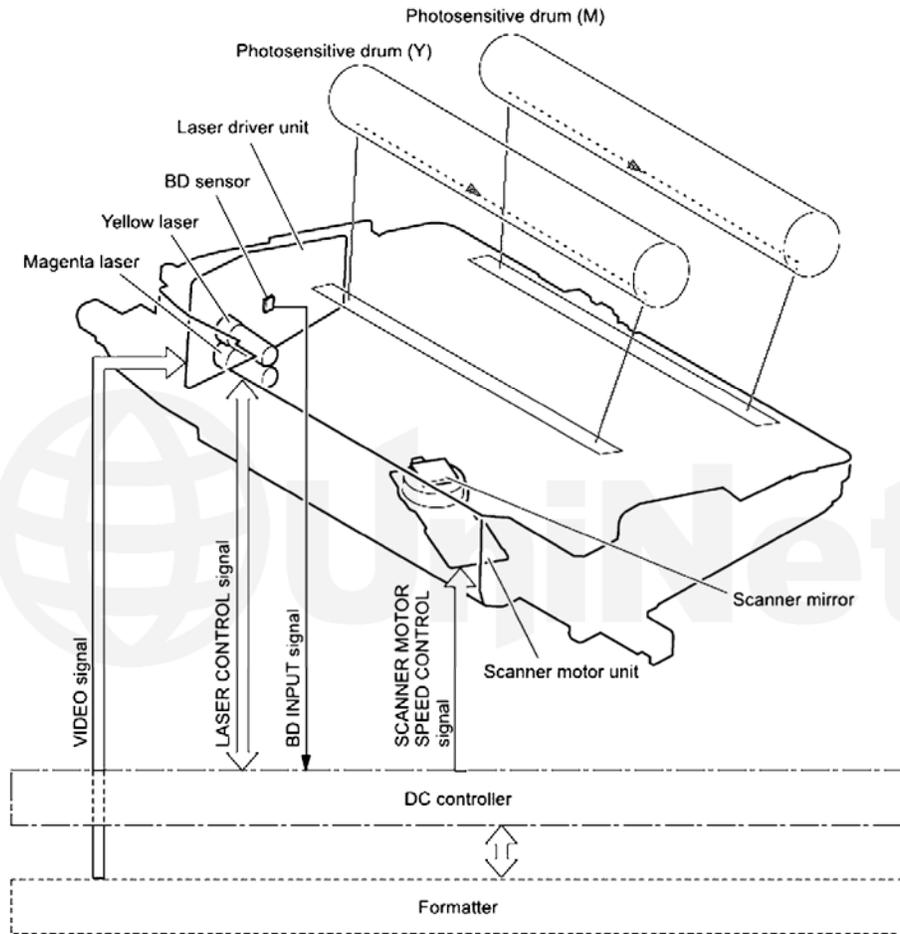


In the **first** stage, light from the pre-exposure LED strikes the drum to remove any residual charges from the drums surface.

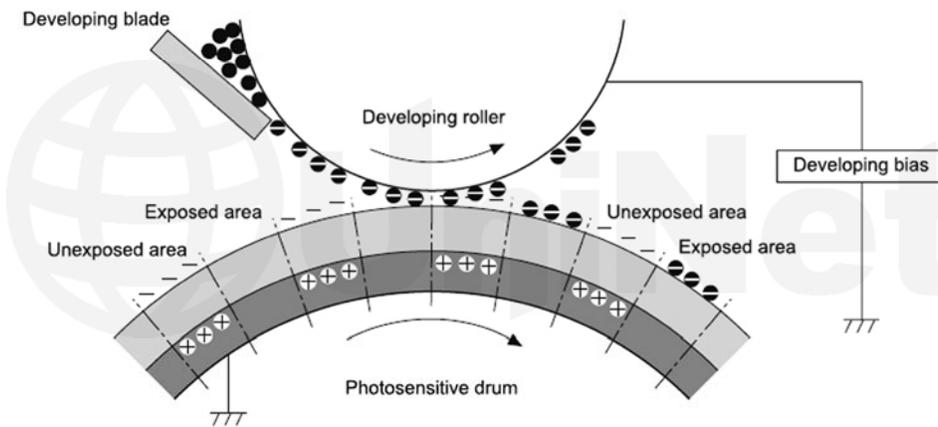


Then, the primary charge roller (PCR) places a uniform negative DC voltage on the OPC drum surface.

The amount of the negative DC voltage placed on the drum is controlled by the printer's intensity setting.



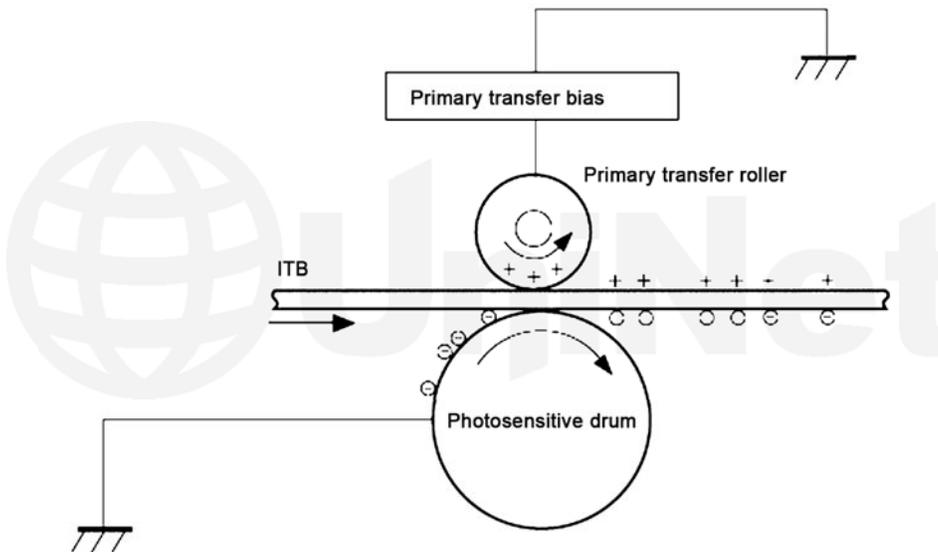
In the **second** stage, the laser beam is fired onto a rotating mirror (called the scanner). As the mirror rotates, the beam is reflected into a set of focusing lenses. The beam then strikes the drums surface, reducing the negative charge and leaving a latent electrostatic image on the drum. The areas where the laser did not strike the drum will retain the higher negative charge.



The **third** or developing stage is where the toner is developed on the drum by the developing section (or supply chamber), which contains the toner particles. The development stage is actually made up of two steps: toner charging, and the actual development. In the toner charging stage, the toner-stirring blade turns inside the hopper. As it turns, friction causes a negative potential to develop on the toner. In addition, a foam feed-roller brings the toner to the developer roller and also places a negative charge on the toner. These two charges help ensure a uniform charge on the toner. Once the toner is properly charged, the toner will coat the developer roller. The toner is also held onto and attracted to the developer roller by another negative DC bias voltage. This voltage is controlled by the printer's intensity setting and causes either more or less toner to be attracted by the developer roller. This in turn will either increase or decrease the print density. The amount of toner on the developer roller is controlled by the doctor blade, which uses pressure to keep the amount of toner on the roller constant.

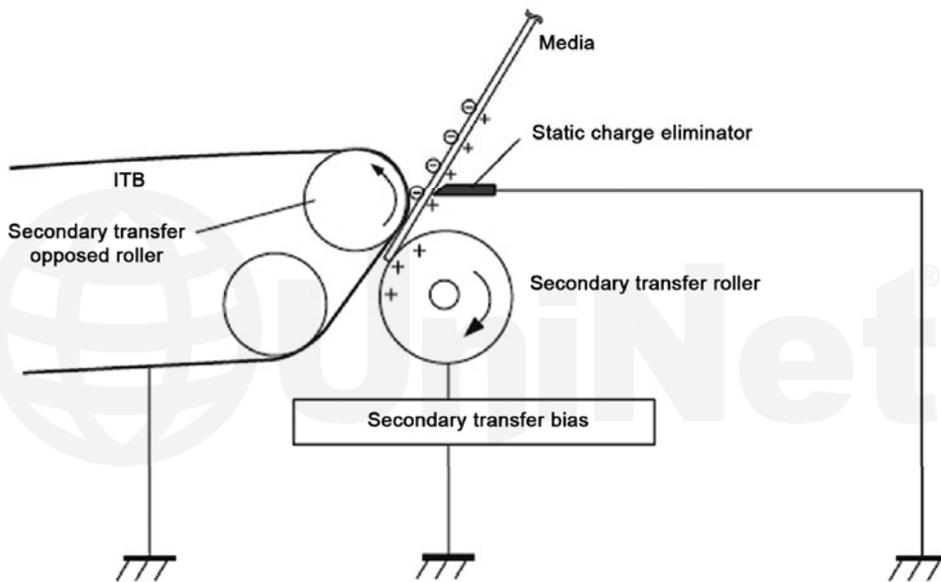
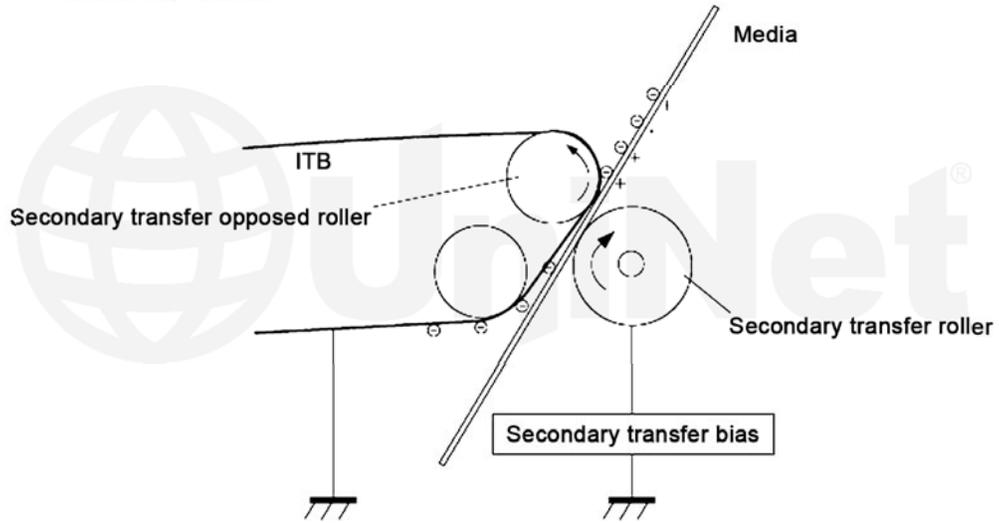
As the laser exposed areas of the OPC drum approach the developer roller, the toner particles are attracted to the drum's surface due to the opposite voltage potentials of the toner, and laser-exposed areas of the OPC drum.

Primary Transfer

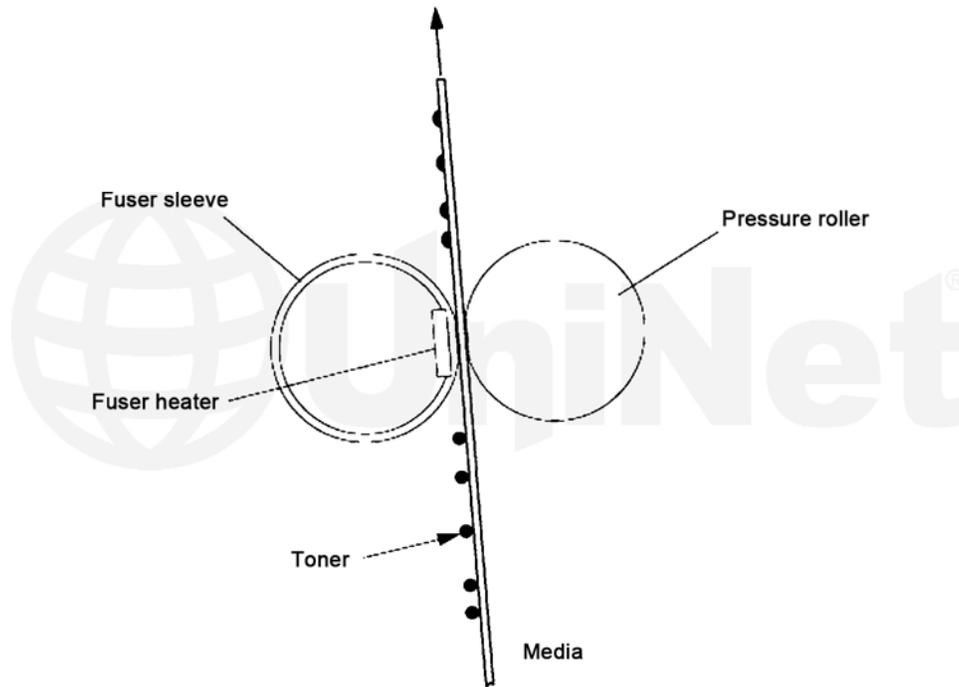


The **fourth** stage is the transfer stage. This is where there are some large differences from monochrome printers and also from other color lasers. In the primary transfer stage, the transfer roller which is located directly opposite each OPC drum places a positive DC bias charge on the back of the ITB (or image transfer belt). Each toner cartridge has a separate transfer charge roller. The image is transferred from the drum directly to the ITB. This process is repeated for each color cartridge in the following order: Yellow, Magenta, Cyan, and Black. At the same time, the paper is moving between the secondary transfer roller and the ITB. As the ITB passes the secondary transfer roller, the positive charge is picked up, and draws the negatively charged toner off the belt and onto the paper. Note that this entire process is upside down from all previous HP engines. The ITB and transfer rollers are on top of the OPC drum, not underneath it.

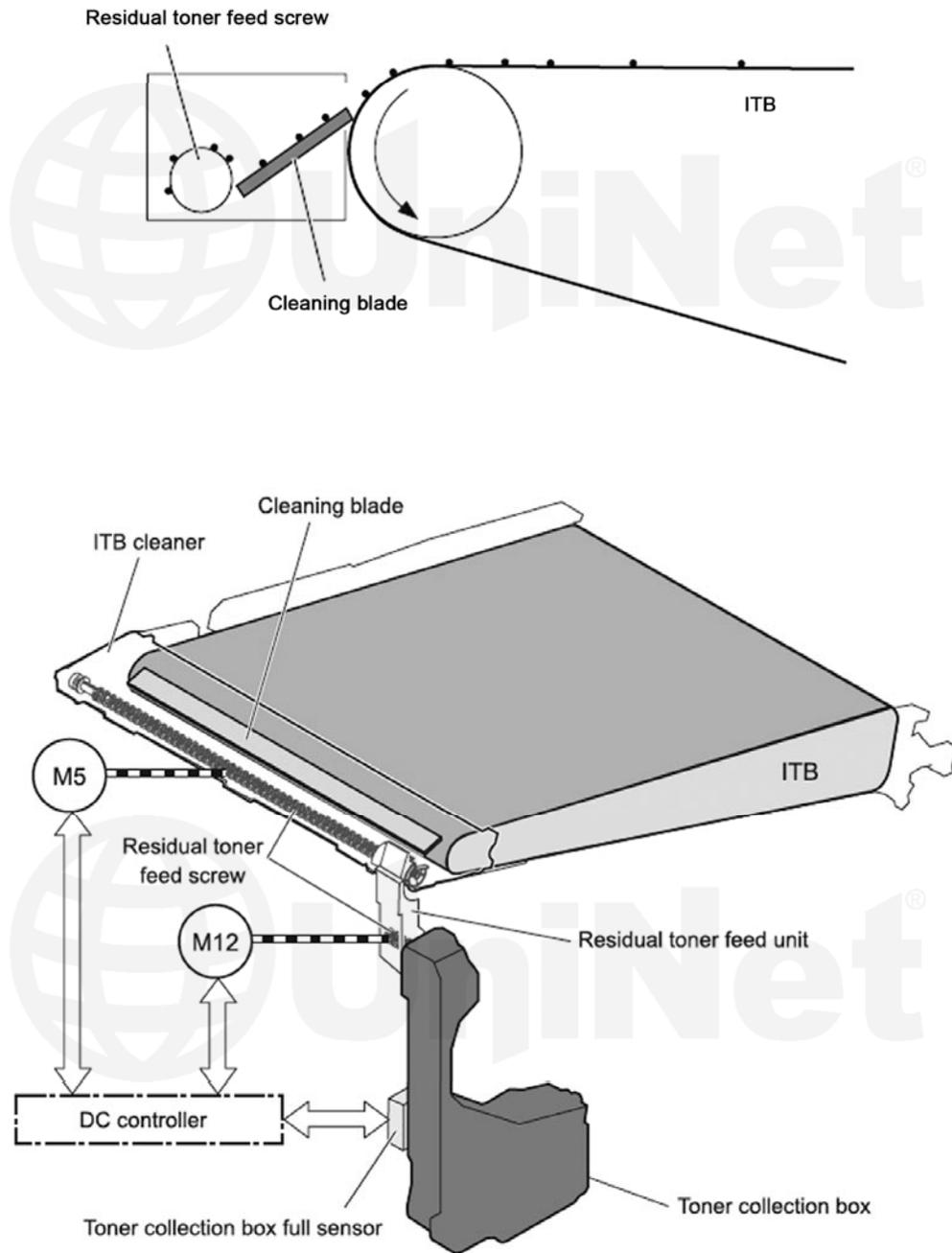
Secondary Transfer



The paper separates from the ITB belt as the belt reaches the top of its path and turns back down to start the process again. The static charge on the back of the paper is decreased with static charge eliminator. This helps stabilize the paper feed, and also prevents toner flares (spots) under low temperature and low humidity conditions.



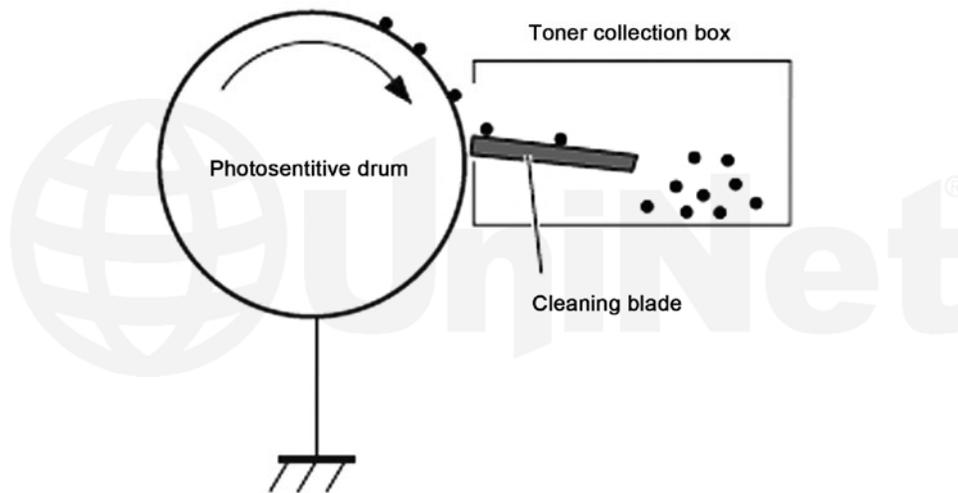
In the **fifth** stage, the image is then fused onto the paper by the fuser assembly. The fuser assembly is comprised of the upper heating assembly and lower pressure roller. The lower pressure roller presses the page up into the upper heating assembly, which then melts the toner into the paper. This heating assembly consists of a flexible sleeve with a ceramic heating coil inside. This type of fuser affords “instant on” fusing with little to no wait time, and low power consumption.



ITB CLEANING

The ITB is cleaned by the ITB cleaning blade.

The ITB wiper blade scrapes off the residual toner and an auger moves the toner to the toner collection box.



OPC DRUM CLEANING

The drum is cleaned after the image is transferred to the paper by the wiper blade. This part is fairly standard; the wiper blade scrapes the toner off the drum, and the recovery blade guides it into the waste chamber.

PRINTER CALIBRATION

At the start of all this is the cartridge detection process, toner level detection, and then the calibration cycle. The printer will calibrate itself whenever the printer is turned on (within 15 minutes), when a new toner cartridge is installed, and after 48 hours of run time. Calibration consists of a solid block and halftone of each color being printed to the ITB. As the printed areas get to the top of the belt, a sensor will detect them, measure the density, and adjust the printer accordingly. All of the calibration time settings are user controllable.

Taking test prints, cartridge troubleshooting as well as minor printer troubleshooting will be covered at the end of this article.

REQUIRED TOOLS

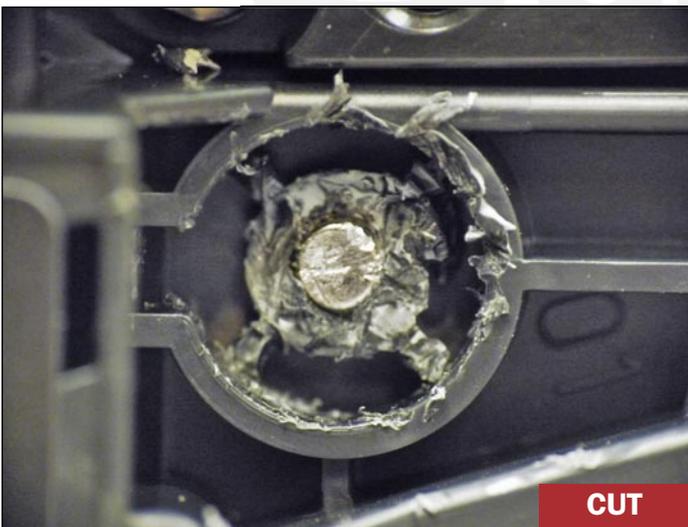
1. Toner approved vacuum
2. A small screwdriver (common style)
3. A Phillips head screwdriver
4. Needle nose pliers

REQUIRED SUPPLIES

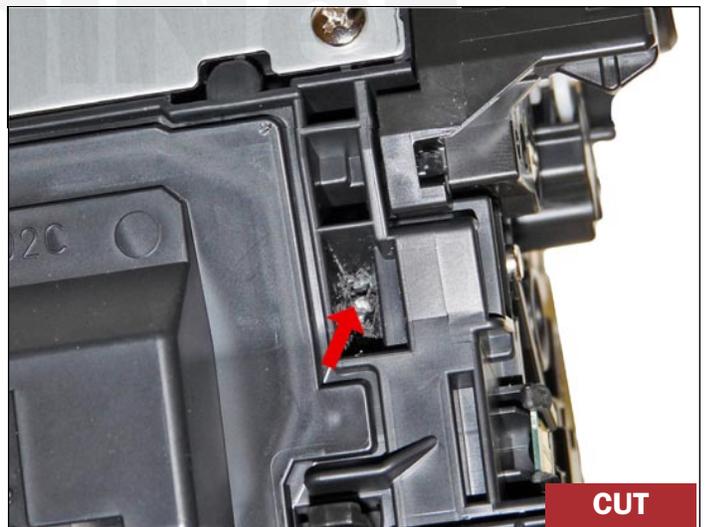
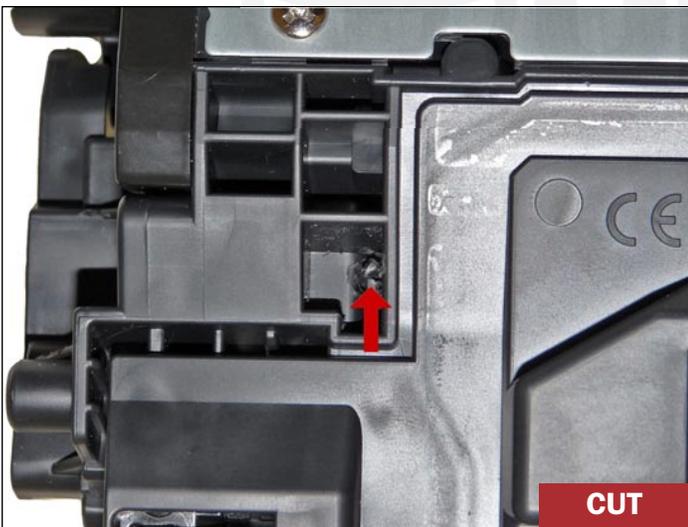
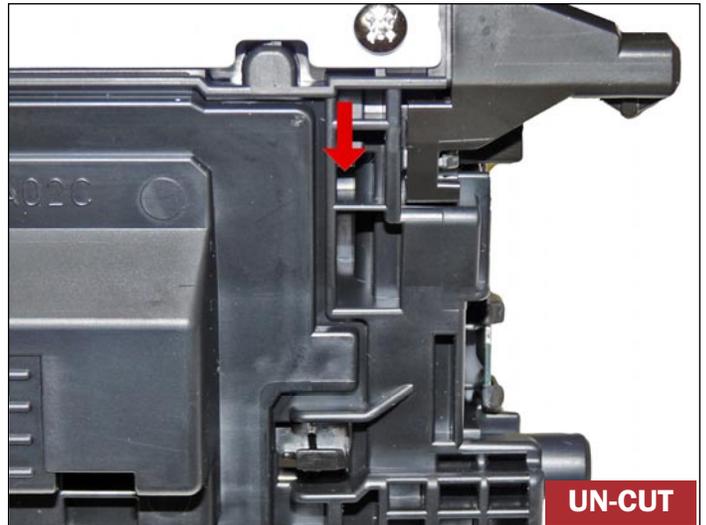
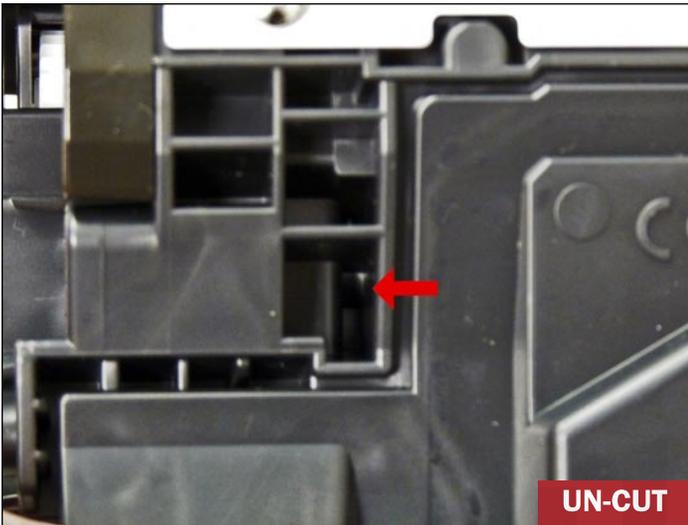
1. Dedicated color toner for use in CM551
2. New replacement chip
3. New long-life drum
4. New wiper blade
5. New toner feed roller (optional)
6. New PCR (optional)
7. New doctor blade (optional)
8. Doctor blade spacers
9. Drum cover
10. Lint-free cloths
11. Conductive grease



1. Remove the spring from the label side of the cartridge.



2. With a razor knife, carefully shave the plastic from the heads of the hinge pins.

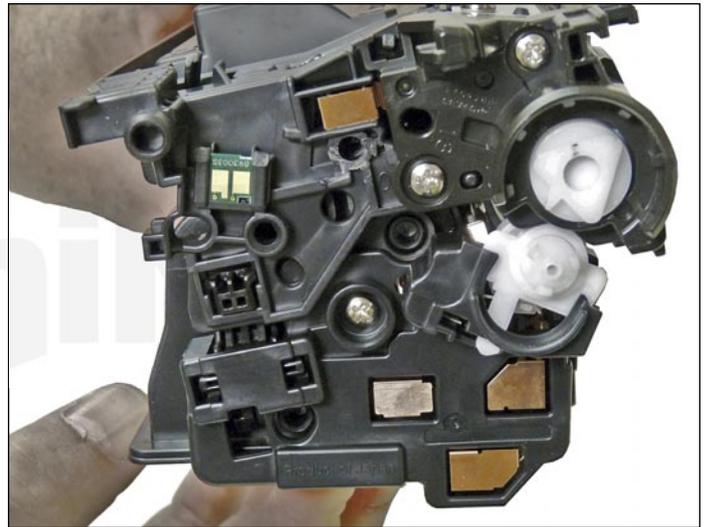


3. Position the cartridge so that the wide label is in front and the metal bar is on top.

Drill a shallow hole on each side of the cartridge as indicated.



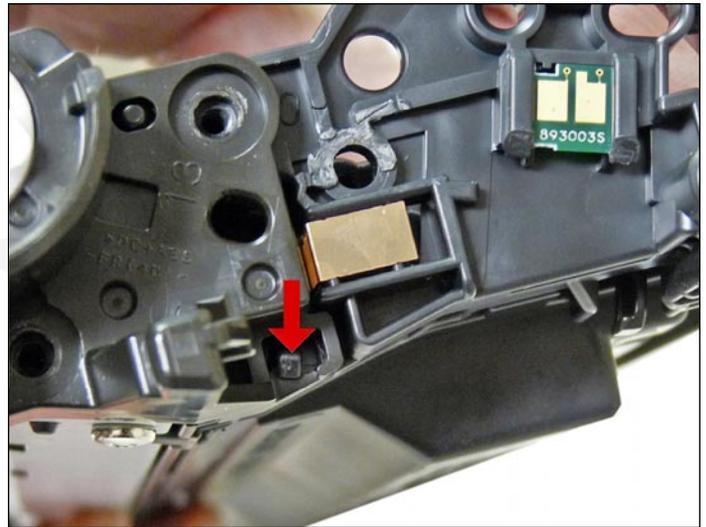
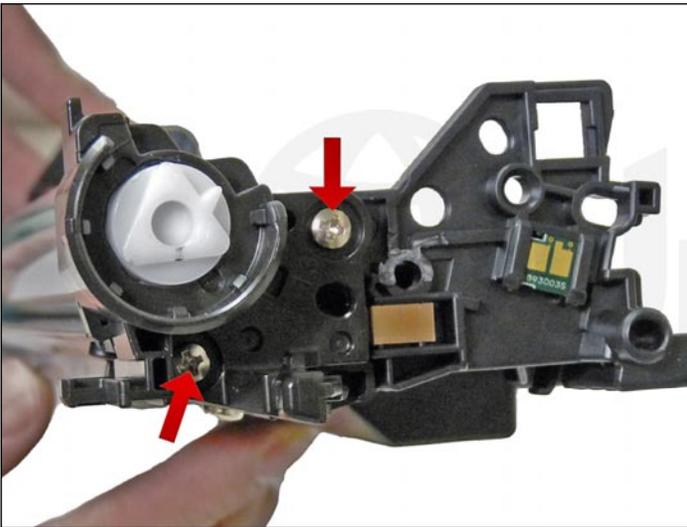
4. Push the pins out with a jeweler's screwdriver. With the hole in this location, and by just pushing the screwdriver in, the pins will be pushed out. Remove the pins. The gear side has the smaller of the two pins.



5. On the gear side press in on the plastic locking mechanism.

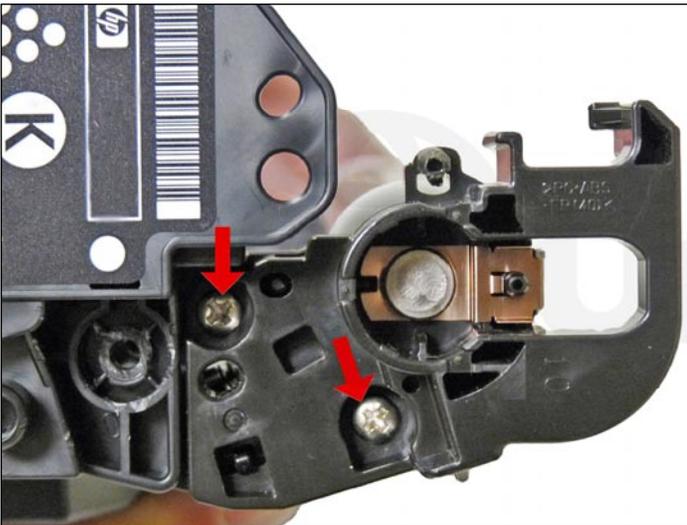


6. On the opposite side lift up on the waste chamber until the two halves separate.



7. On the waste chamber, remove the two screws from the drum gear end cap.

Press in on the tab as shown and remove the end cap.



8. Remove the two screws from the contact side end cap.

Remove the end cap.

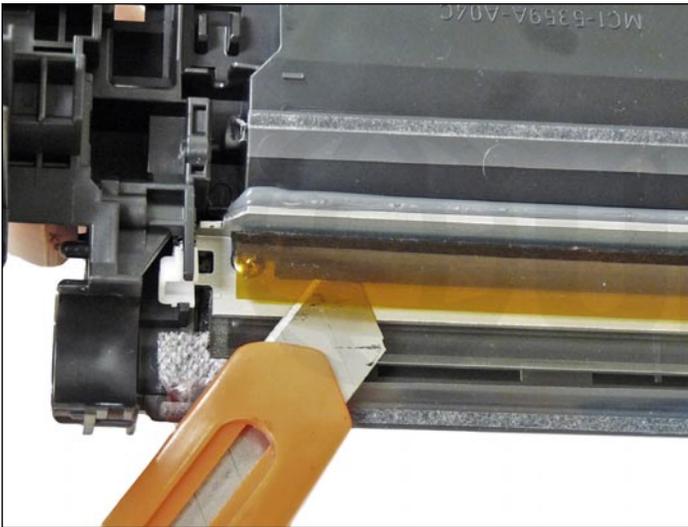


9. Remove the drum.



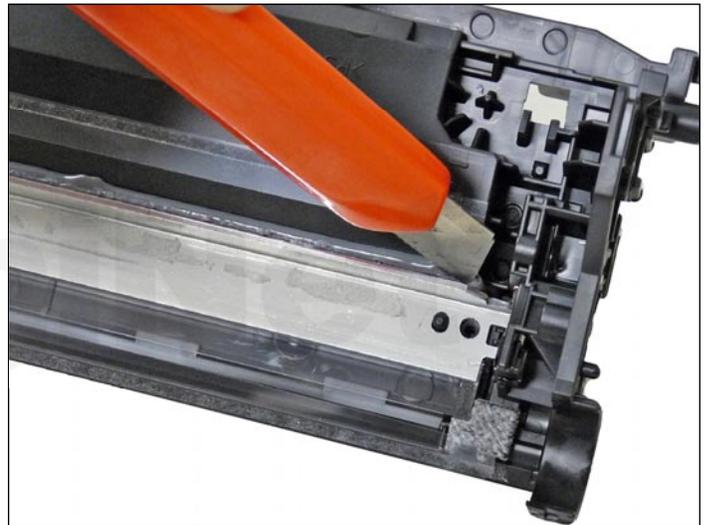
10. Remove the PCR by lifting up on the black and white PCR locking arms.

Remove the PCR assembly.



11. To remove the wiper blade, the amber film assembly needs to be removed.

Slide a razor knife under the plastic mounting bar, and remove the assembly.



12. Remove the two screws from the wiper blade.

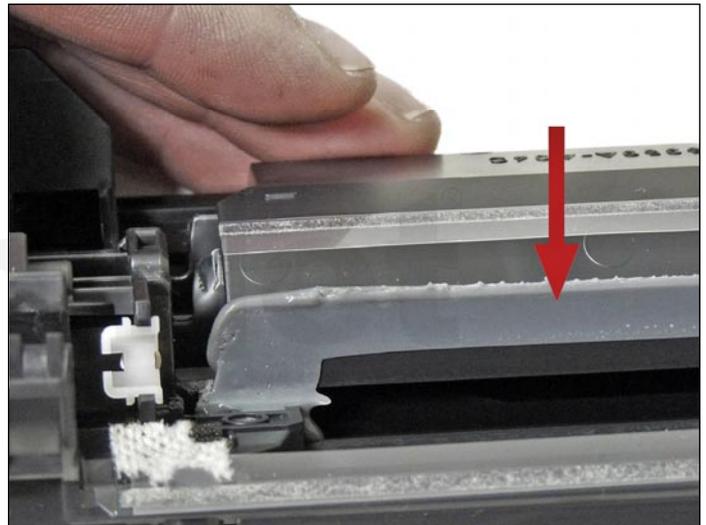
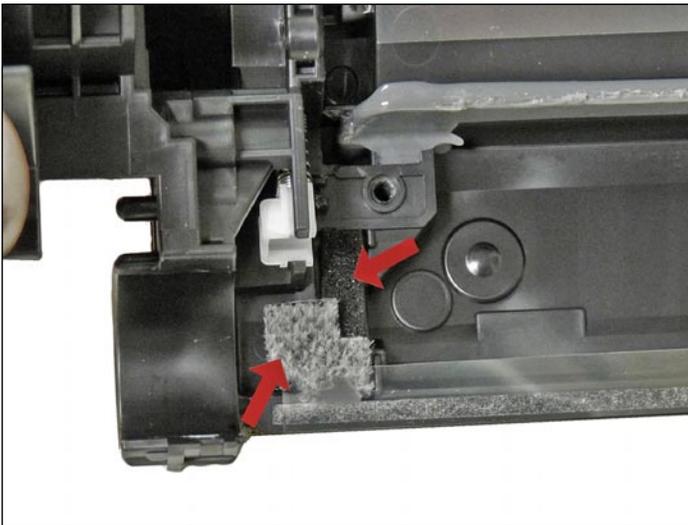
Slide the razor knife along the back edge of the blade to release it from the glue.

Remove the wiper blade.

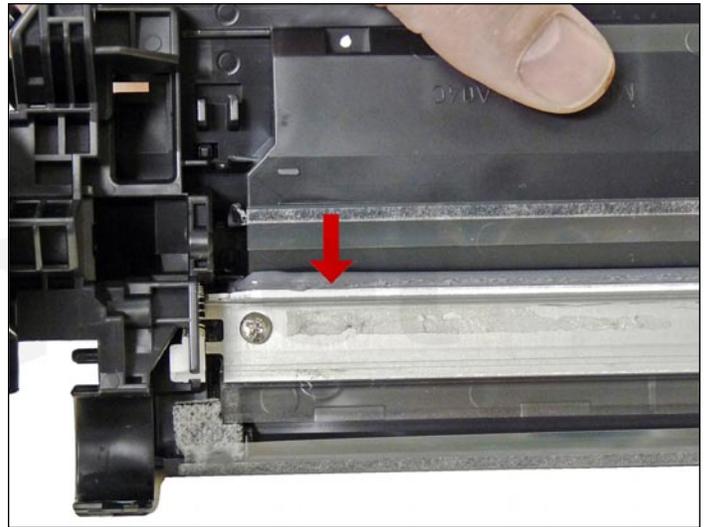


13. Clean out all the waste toner from the chamber.

Try not to get any toner on the wiper blade seal if possible.



14. Clean the felt seals on each end of the wiper blade. If the wiper blade glue has toner on it, clean it off with alcohol and a foam swab. If it does not become sticky again, it needs to be removed, and a good silicone caulk used to seal the blade off. GE 100% Silicone and Phenoseal are two good brands for this.

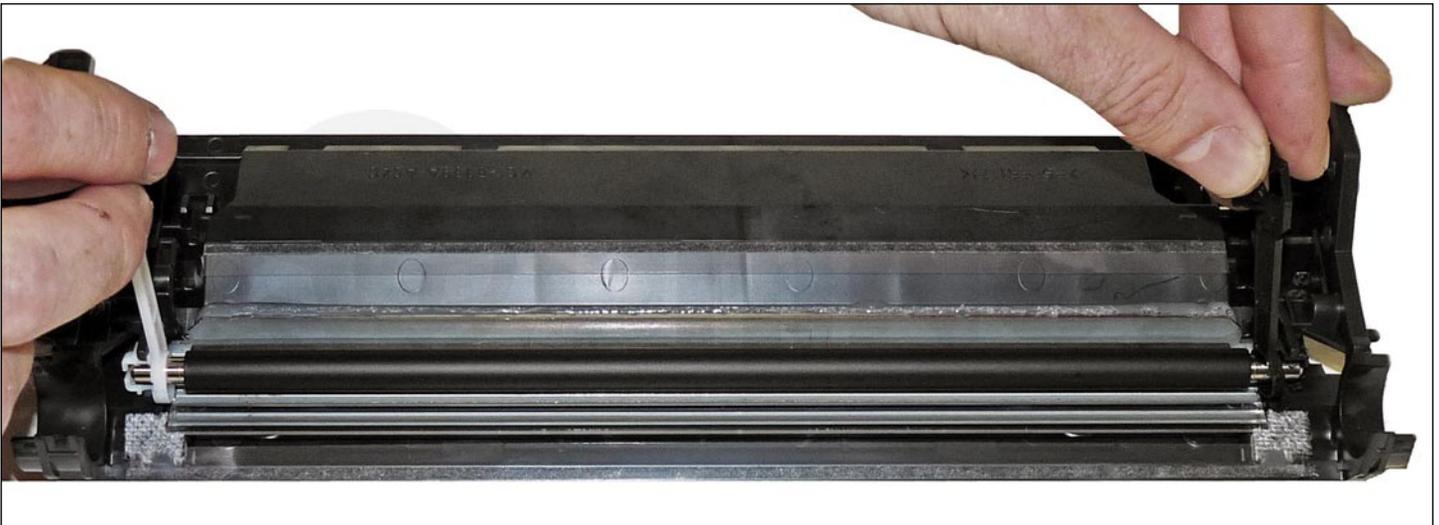


15. Install the new wiper blade and two screws.

If you removed the wiper blade glue, seal the back edge of the blade with the silicone now.



16. The amber film assembly is held in place with double-sided tape. If this is not sticking, remove the old with alcohol and replace. Replace the film assembly.



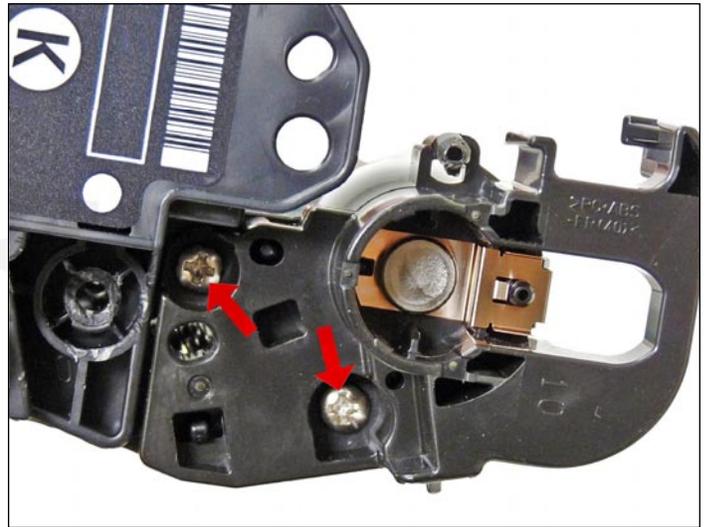
17. Clean the PCR with your preferred cleaner and install in the cartridge.



NOTE: Make sure you lock the locking arms in place.



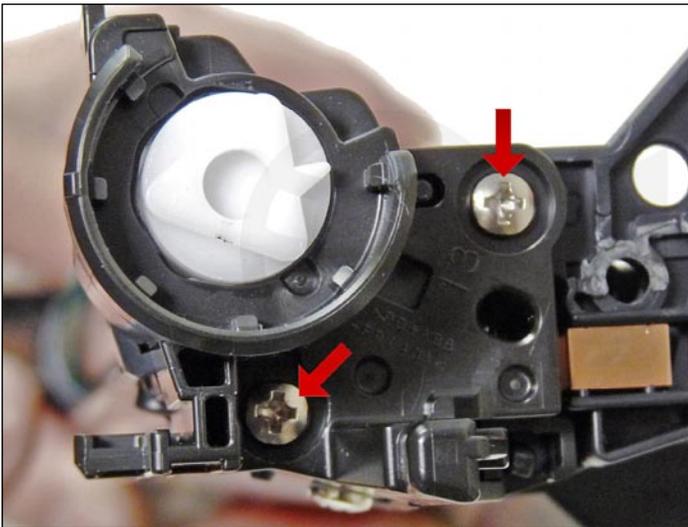
18. Install the drum, short hub side to the right (or label side) of the chamber.



19. Install the contact end cap on the right or label side of the chamber.

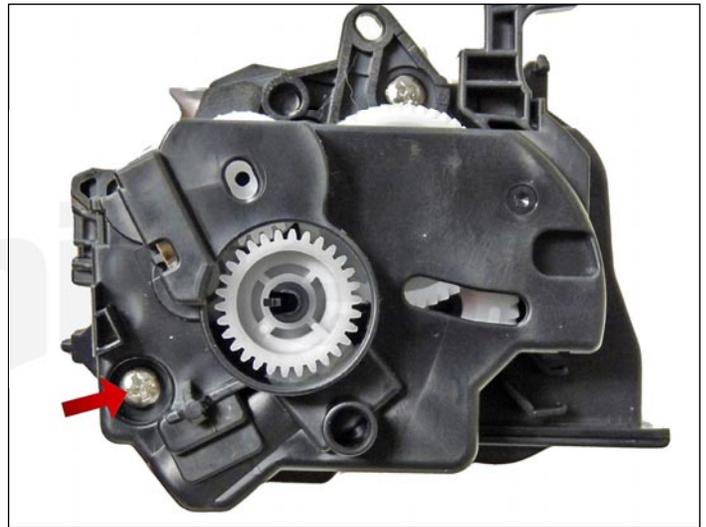
If the conductive grease is contaminated, clean it and replace it with fresh grease.

Install the two screws.



20. Install the opposite side end cap and two screws.

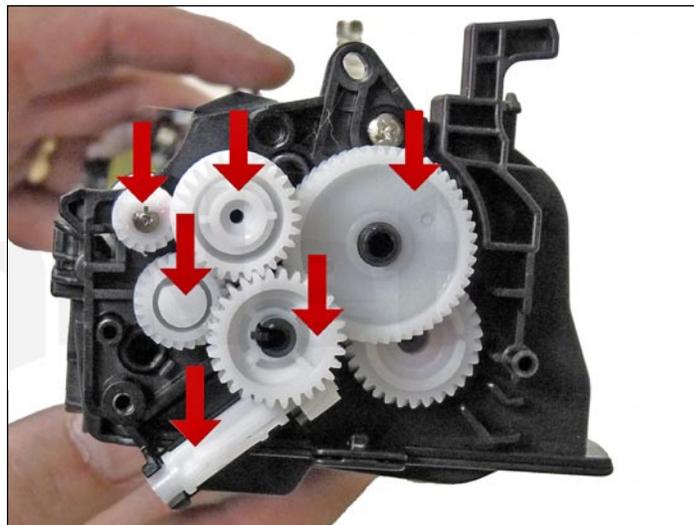
Place the waste chamber aside.



21. On the supply chamber, remove the outer screw from the gear side end cap.



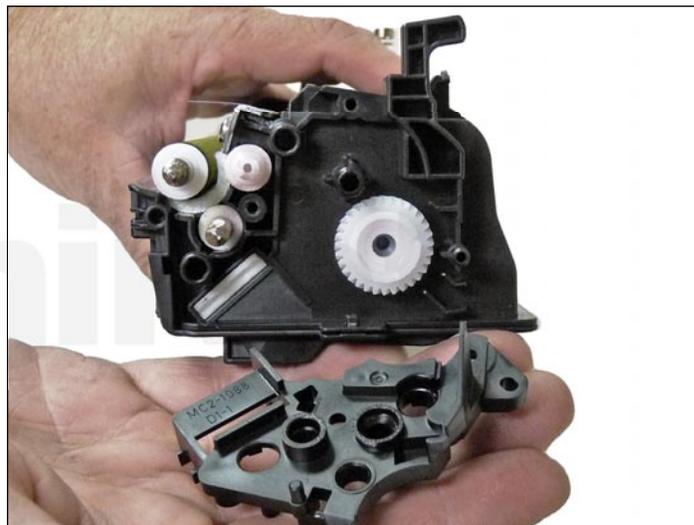
22. Press in on the tab and remove the end cap.



23. Remove all the gears as shown, except for the mixing blade gear. This is attached to the mixing blade. It is very difficult to re-attach properly.

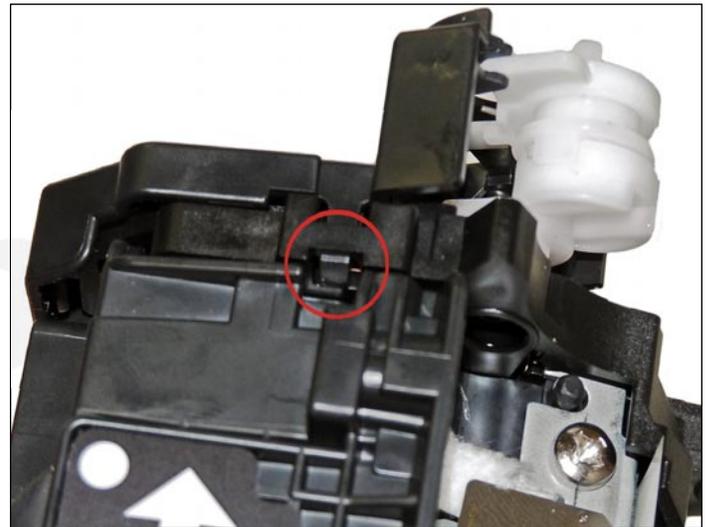
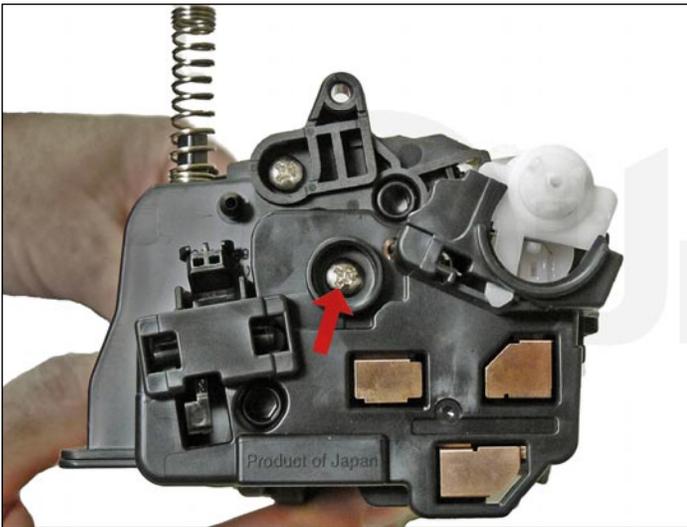


24. Remove the two inner screws, and inner gear end cap.

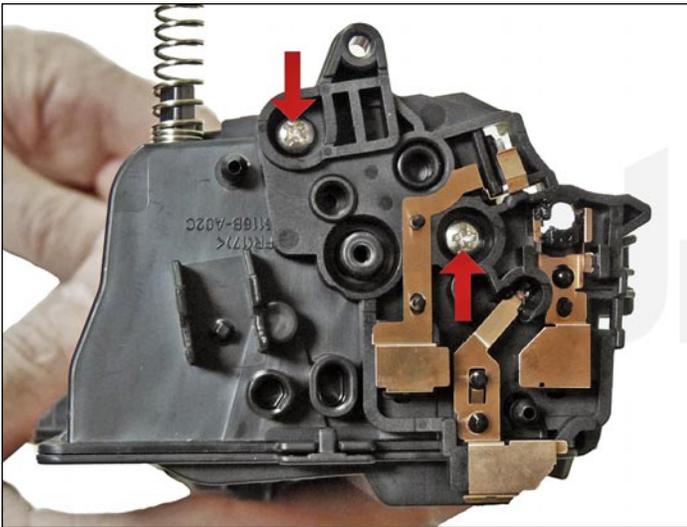




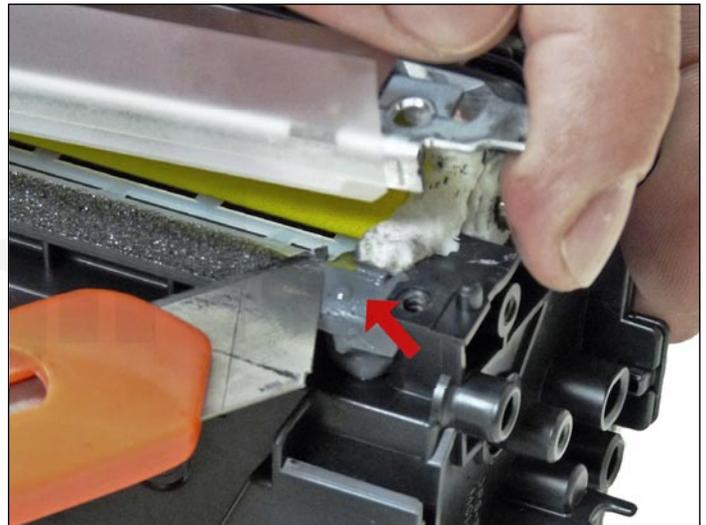
25. Remove the developer roller.



26. On the opposite side end cap, remove the single screw and press in on the tab to release it.



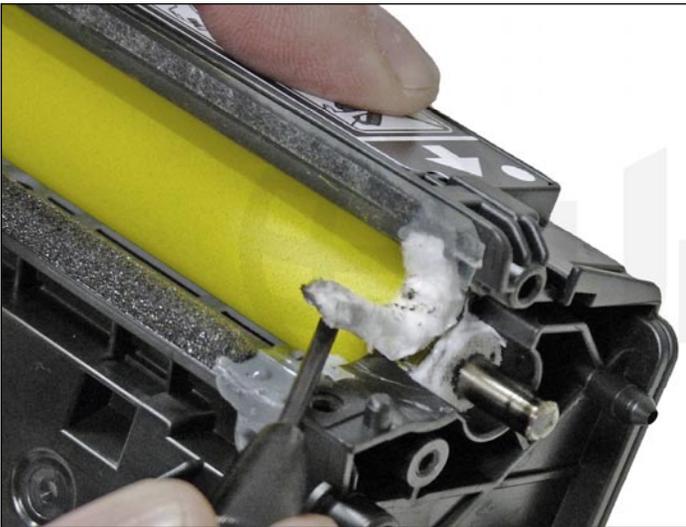
27. Remove the two screws and contact side end cap.



28. Remove the two screws from the doctor blade and start to lift the blade up.

There is glue on either end of the blade.

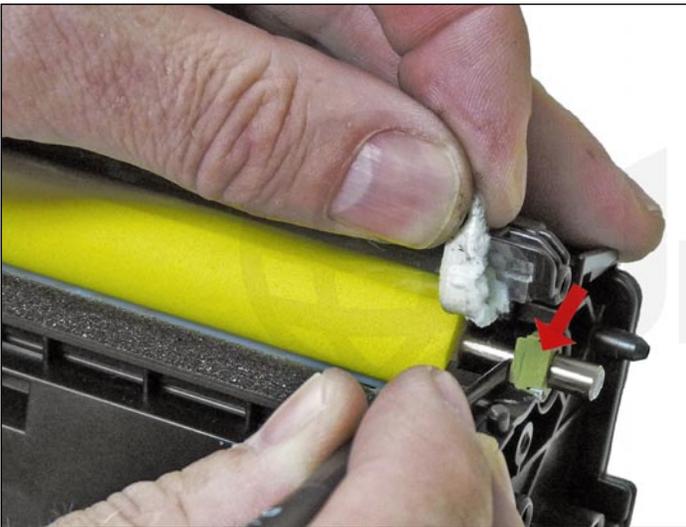
As you lift the blade up, slice the glue away from the blade with the razor knife.



29. On the right side of the chamber lift up the felt developer roller seal. Lift it from the front side and lay it over the back.



30. Remove the white felt washers from both sides of the developer roller.



31. Pry out the feed roller bushing from the right side.

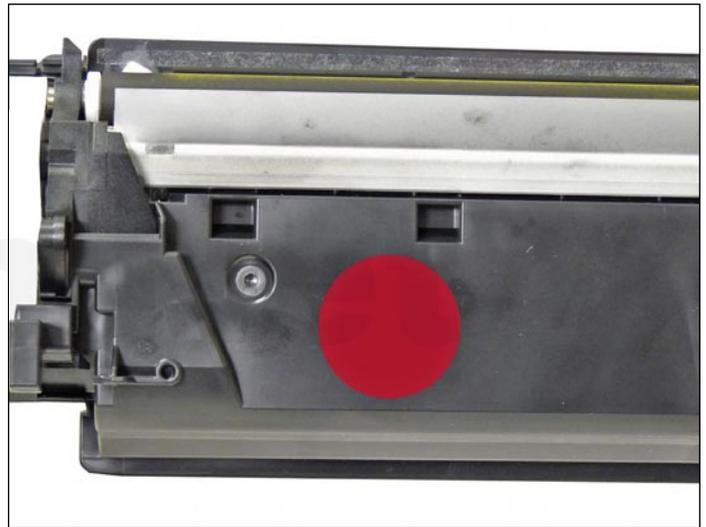
UniNet®



32. Remove the feed roller.



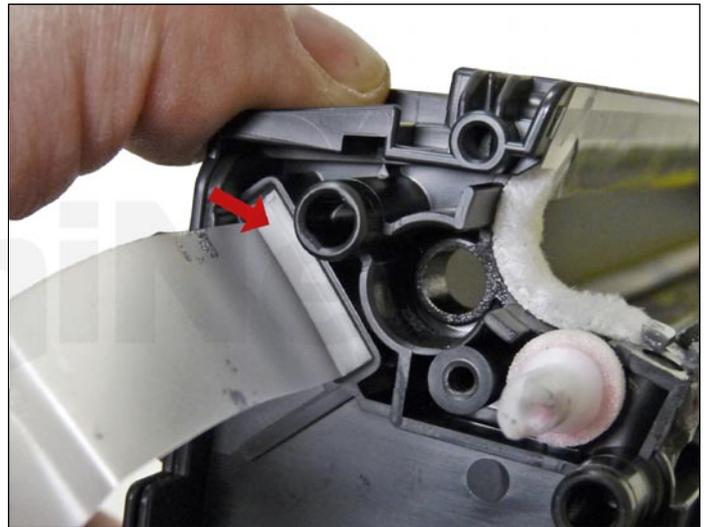
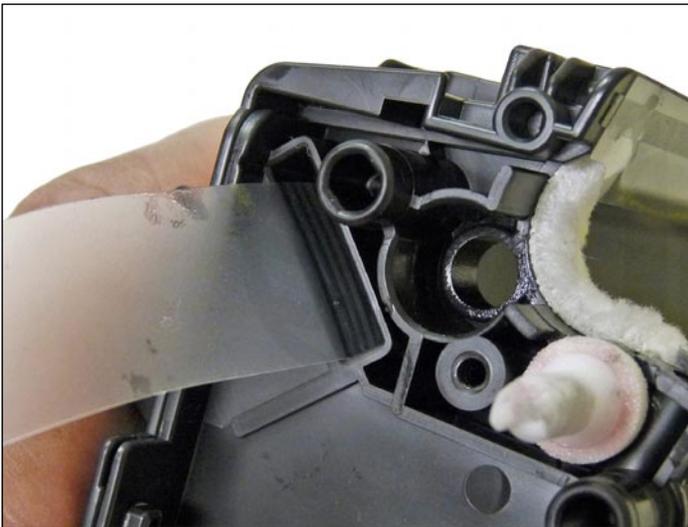
33. Clean out the remaining toner and fill with new dedicated toner for use in M551.



If you wish to make it easier to seal, a hole can be cut in the flat side of the chamber. Install the seal, and then fill through the hole. Make sure you cover the hole with a good quality seal!



34. Install the seal onto the seal rails. Pull the release tape off one inch at a time and press the seal in place as you go.

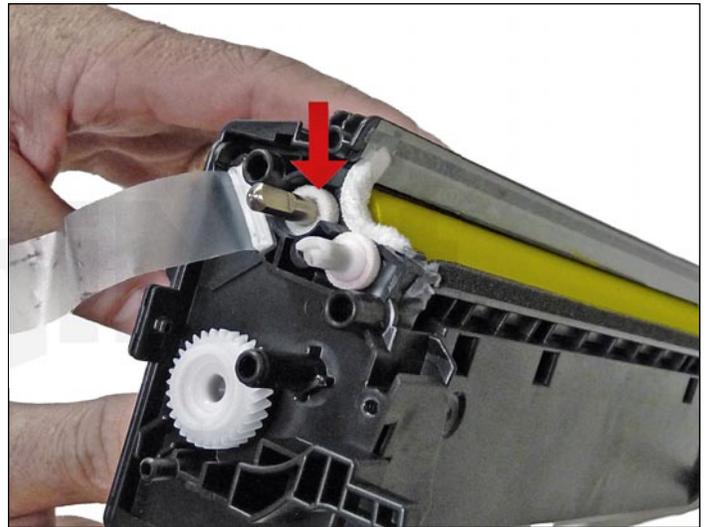


35. Remove the seal port and slide the seal pull-tab through the slot.

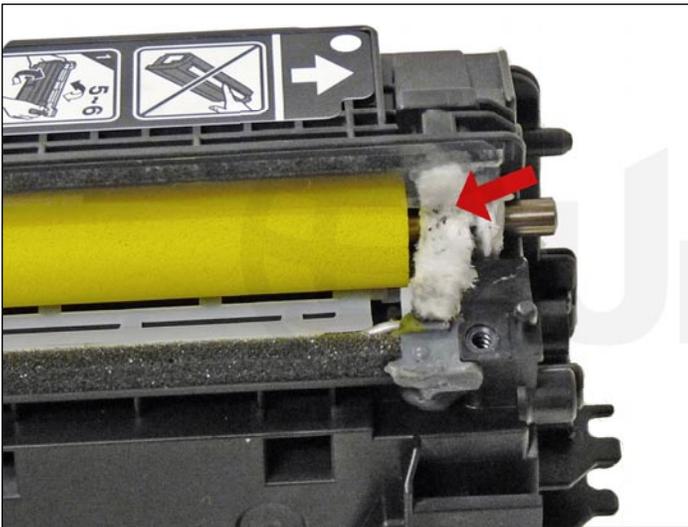
Install the seal port.



36. Install the feed roller and bushing.



37. Install the feed roller felt washers.

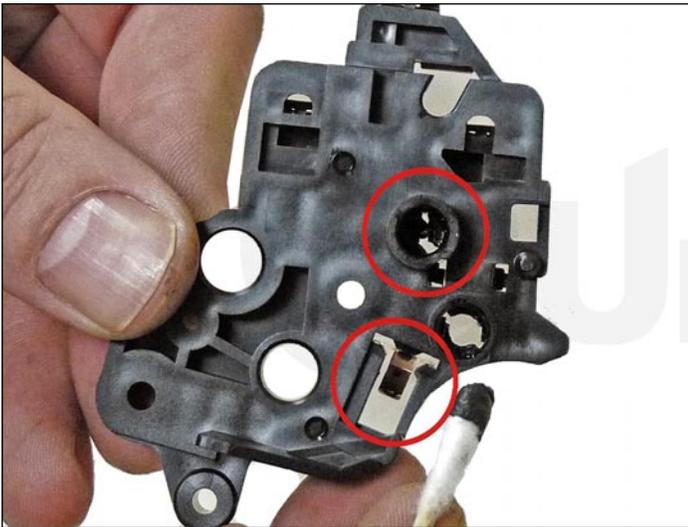


38. Press the developer roller seal back in place.

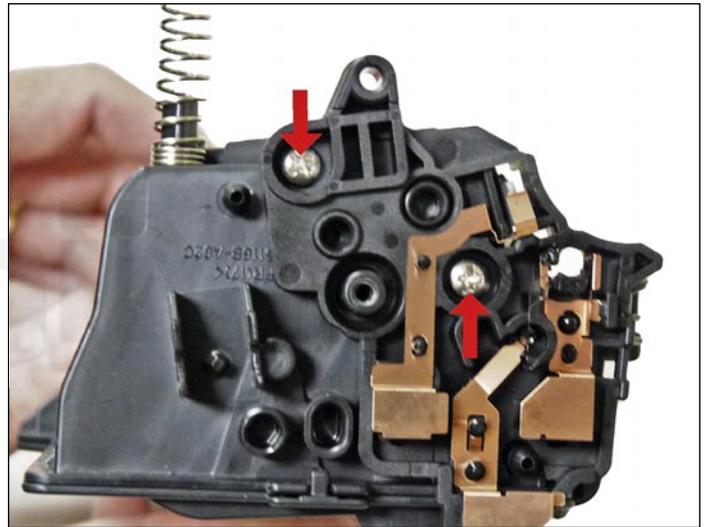
If needed, clean the adhesive with alcohol and a foam swab.



39. Use the appropriate shims and install the doctor blade and two screws.



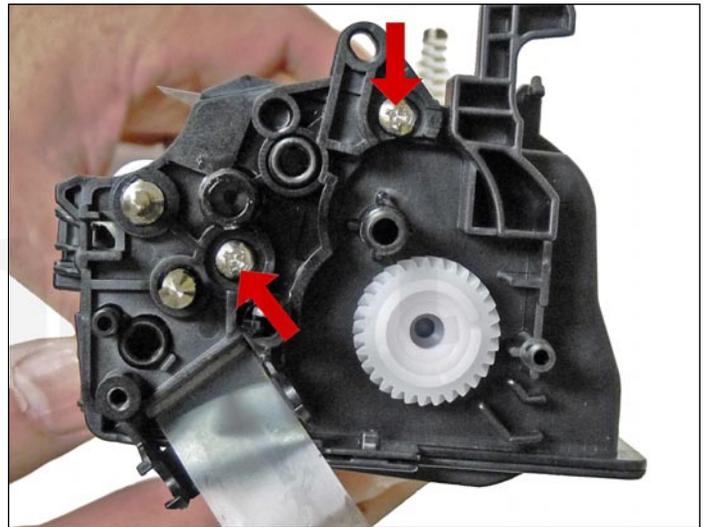
40. Clean the contacts and replace the conductive grease on the contact end cap.



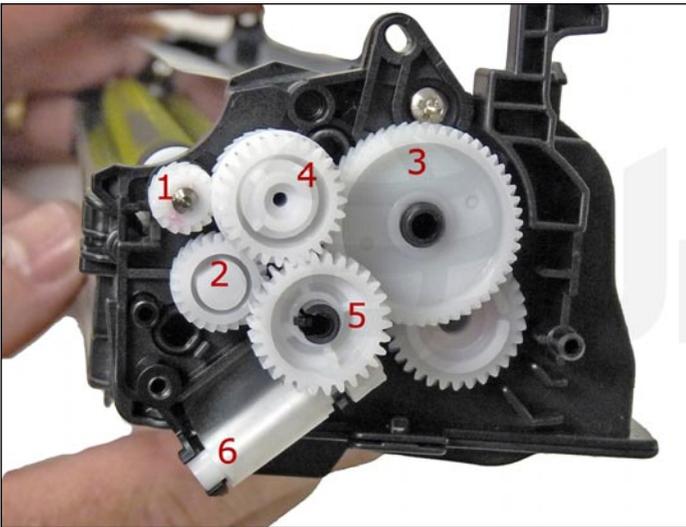
41. Install the contact end cap and two screws.



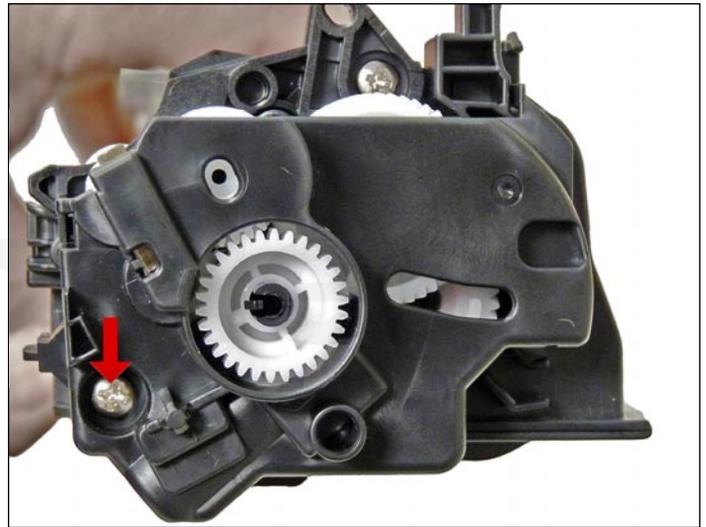
42. Install the cleaned developer roller (do NOT use any chemicals to clean this; a lint-free cloth works fine).



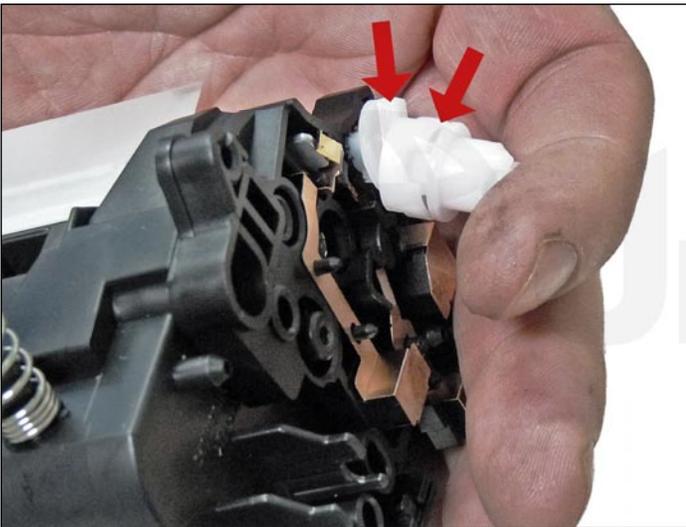
43. Install the inner gear end cap and two screws.



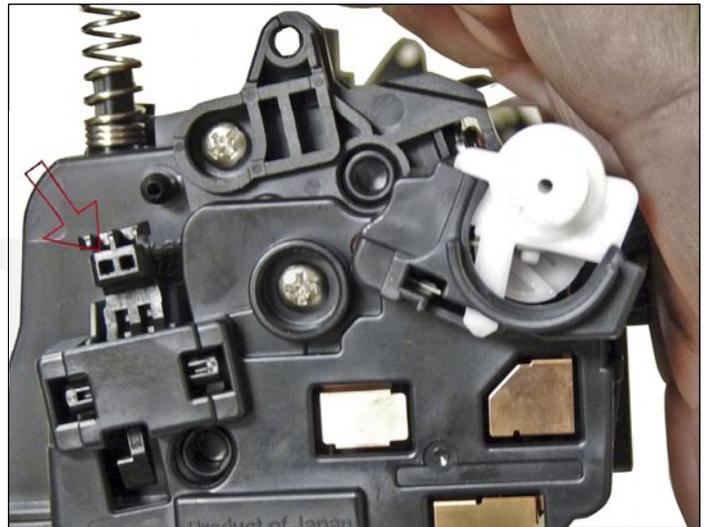
44. Install the gears in the order shown. If you installed a seal, slide the seal end through the take up gear and wrap the loose tail tight on the roller.



45. Install the gear cover end cap and screw.



46. Install the opposite side end cap.



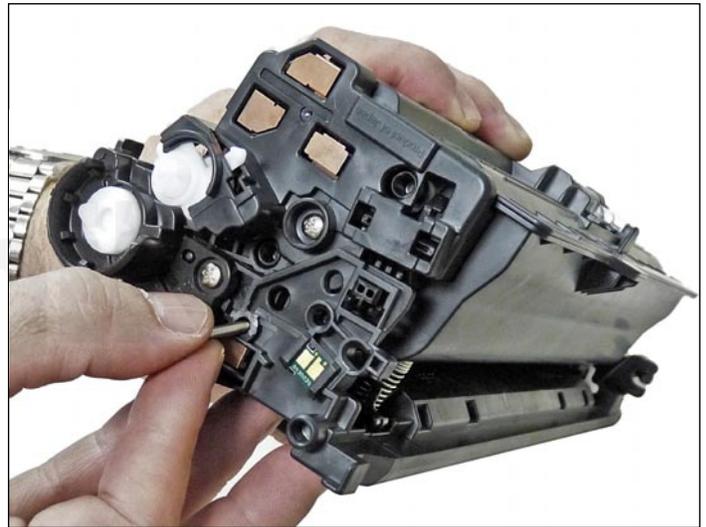
Place the triple gear on the developer roller shaft and fit into the spring assembly on the end cap.

Install the screw.

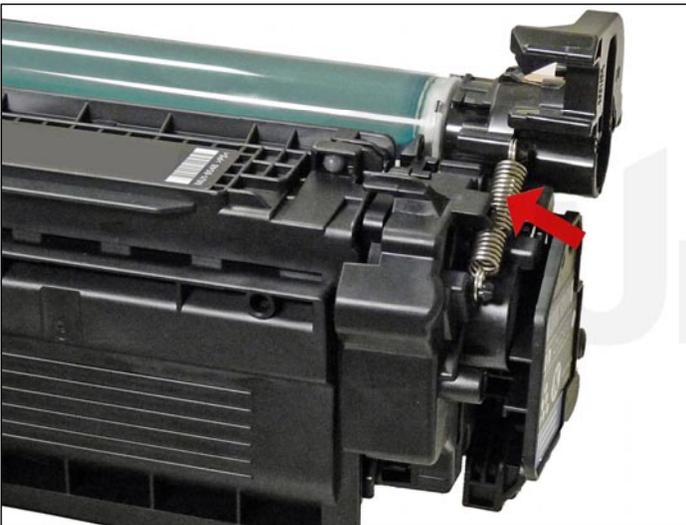


47. Place the two halves together, contact side first.

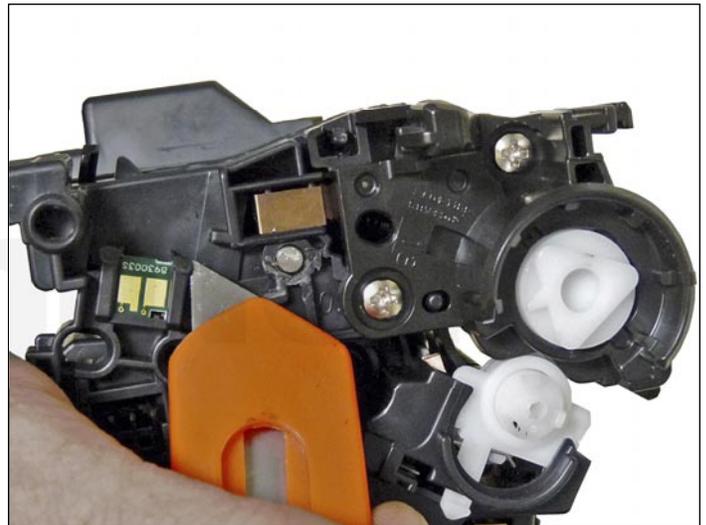
On the gear side, snap the lock in place.



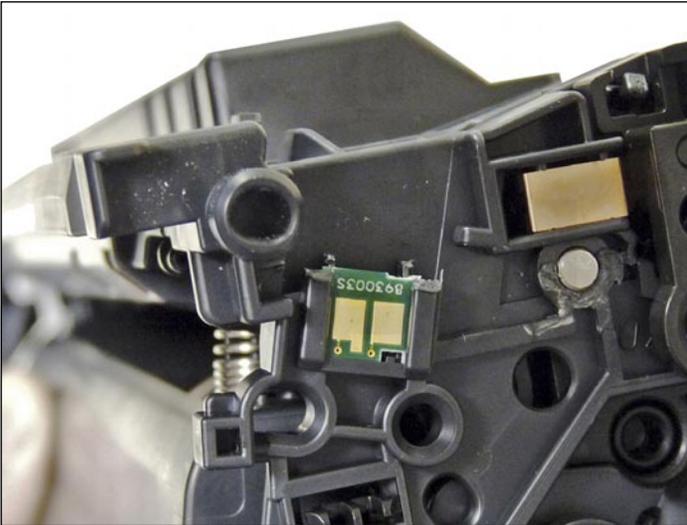
48. Install the two pins, small pin to the gear side of the cartridge.



49. Install the spring.



50. Remove the chip by cutting the plastic off the edges of both side of the chip.



51. Remove and replace the chip. If the new replacement chip is loose in the slot. Close off the top edges with small amounts of hot glue.



52. Install the drum cover on to the cartridge.

TAKING TEST PRINTS

Test Pages

1. Press the HOME button
2. Press the down arrow until ADMINISTRATION appears on the display
3. Press the REPORTS MENU
4. Press the down arrow until CONFIGURATION/STATUS PAGES appears on the display
5. Press the down arrow until PRINT CONFIGURATION, SUPPLIES STATUS PAGE, MENU MAP, DEMO PAGE, RBG/CMYK SAMPLES, or one of the FONT LISTS appears on the display
6. Press OK

Cleaning Pages

1. Press the HOME button
2. Press the down arrow until DEVICE MAINTENANCE MENU appears on the display
3. Press the down arrow until CALIBRATE/CLEANING MENU appears on the display
4. Press the down arrow until CLEANING SETTINGS appears on the display
5. Press the down arrow until PRINT CLEANING PAGE appears on the display

REPETITIVE DEFECT CHART

Primary charge roller:	27.0 mm
Developer roller sleeve:	32.0 mm
Primary transfer roller:	44.0 mm
Supply roller:	49.0 mm
Secondary transfer roller:	50.0 mm
ITB Secondary transfer roller:	63.0 mm
Printer (distance from secondary transfer roller to fuser):	66.0 mm
OPC drum:	75.5 mm
Fuser sleeve:	77.0 mm
Fuser pressure roller:	78.0 mm
Printer (distance from PCR to secondary transfer roller [k]):	80.0 mm
Cartridge (distance from centerline of one OPC to the next):	92.0 mm
Printer (distance from registration roller to secondary transfer roller):	105.0 mm

SOME OF THE MORE COMMON PRINTER ERROR MESSAGES

Most of the error messages are in plain English, but some are numeric only. We have listed the more common ones here. Most of the internal errors listed in the service manual just state something like “internal hardware error.” They are not very helpful.

10.XX.34 - Used supply in use

00: Black
01: Cyan
02: Magenta
03: Yellow

10.YY.25 - Wrong cartridge in (color) slot

00: Black
01: Cyan
02: Magenta
03: Yellow

10.XX.YY - Supply memory error, cartridge/chip is bad/missing

XX =

00: Memory tag error
10: Memory tag missing

YY =

00: Black
01: Cyan
02: Magenta
03: Yellow

PRINT DENSITY/COLOR SETTINGS

This is all best changed from the printer driver software on the computer the printer is attached to.